Tanta University | Department: Computers and Automatic Control Engineering | Faculty of Engineering

Total Marks: 25 Marks

Course Title: Signals and Systems	Course Code: CCE2210	Year: 2nd
Date: 19 /4 /2015 (Second term)	Allowed time: 1hr	No. of Pages: (1)

Answer the following questions

Question (1) (15 Marks)

Consider a control system represented by the block diagram shown in Fig. 1

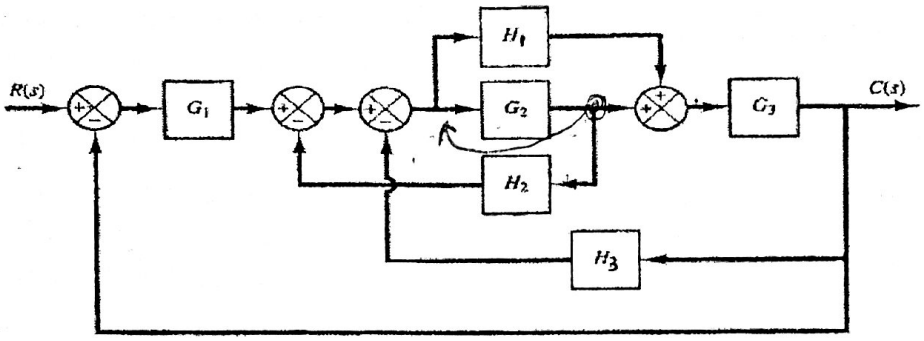


Fig. 1 Block diagram of a control system

Obtain the closed-loop transfer function ***C(s)/R(s)*** using:

i. Block diagram simplification
ii. Signal flow graph

$$\frac{G_1G_2G_3 + G_1G_3H_1}{1 + G_1G_2G_3 + G_2G_3H_3 + G_2H_2 + G_1G_3H_1 + G_3H_1H_2}$$

Question (2) (10 Marks)

When the unity feedback system shown in Fig. 2 is subjected to a unit-step input, the system output responds as shown in Fig. 3. Determine the values of ***K*** and ***T*** from the response curve.

$$\frac{K}{Ts^2 + s + K}$$

$$\frac{K/T}{s^2 + \frac{1}{T} + \frac{K}{T}}$$

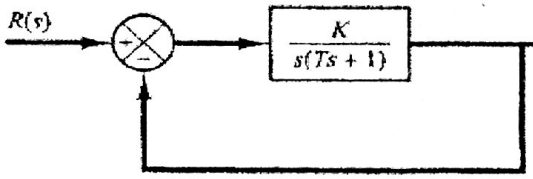


Fig. 2 Unity feedback system

$$e^{\frac{-\pi y}{\sqrt{1-y^2}}} = 0.254$$

$$\pi^2 y^2 = \ln^2(0.254)(1-y^2)$$

$$y^2 = \frac{\ln^2(0.254)}{\pi^2 + \ln^2(0.254)}$$

$$y = 0.3998$$

$$T = 0.87766$$

$$K = 1.78207$$

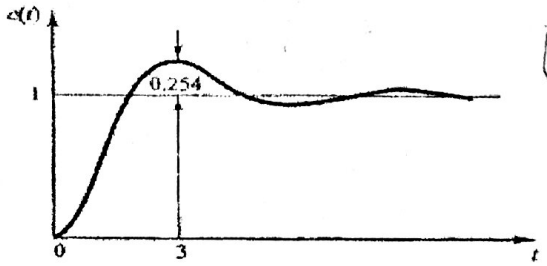


Fig. 3 Unit step response

$$t_p = \frac{\pi}{w_n\sqrt{1-y^2}} = 3$$

$$w_n = \frac{\pi}{3\sqrt{1-y^2}}$$

$$w_n = 1.42495$$

$$\frac{1}{T} = 2w_n y$$

$$\frac{K}{T} = w_n^2$$

Good Luck

Dr. Eng. W. M. Elawady

Tanta University

Department: Computers and Control Eng.
Total Marks: 20 Marks

Faculty of Engineering

Course Title: **Computer Architecture** Course Code: **CCE2209** Year: 2nd Computers
Date: 28 /04/2015 (2nd term) Allowed time: **1.5 hr** No. of Pages: (1)

Remarks: **Please Read the question more than once to fully understand it before you start solving.**

Question (1) (Total 10 Marks)

1- An address field in an instruction contains decimal value 20. Where is the corresponding operand located for : **(5 Marks)**
   a) Immediate addressing?
   b) Direct addressing?
   c) Indirect addressing?
   d) Register addressing?
   e) Register indirect addressing?

2- Design the datapath inside the processor for single bus organization then show the control sequence required to add the contents of memory location LOC to register R2 and store the result into R3.Assume that the instruction consists of two words. The first word specifies the operation and the addressing mode, and the second word contains the number LOC. **(3 Marks)**

3- Compare between hardwired and microprogramed control units in terms of its structure, advantages and disadvantages of each one. **(2 Marks)**

Question (2)(Total 10 Marks)

1- What is the difference between a subroutine and an interrupt service routine? **(2 Marks)**

2- Design 16 bit carry look-ahead adder using 4 bit carry look-ahead adder blocks with additional logic to generate C4, C8, C12 and C16. Show how many gates are required to build the 16 bit carry look-ahead adder. **(4 Marks)**

3- Three devices A, B, and C are connected to the bus of a computer. I/O transfers for all three devices use interrupt control. Interrupt nesting for devices A and B is not allowed but interrupt requests from C may be accepted while either A or B is being serviced. Suggest different ways in which this can be accomplished in each of the following cases:
   a) The computer has one interrupt request line. **(2 Marks)**
   b) Two interrupt lines INTR1 and INTR2 are available with INTR1 having higher priority. **(2 Marks)**
   Specify when and how interrupts are enabled and disabled in each case.

With my best wishes

Course Coordinator: Dr. Mahmoud Alshewimy

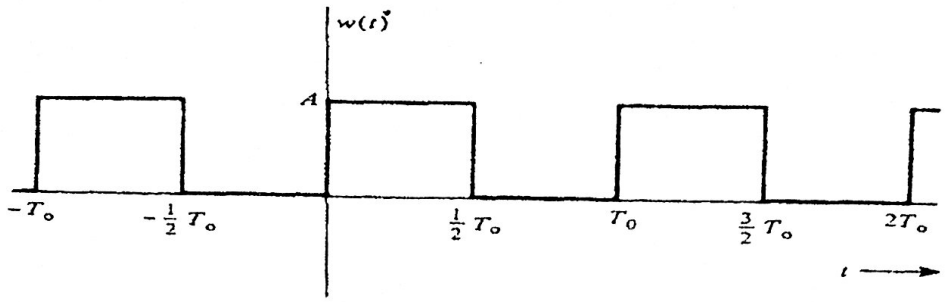
Tanta University — Communications systems

Faculty of Engineering — 2nd Year Computer. Eng. -2015

Mid-Term Exam.

Answer all the following questions:

1. Find the exponential Fourier series and sketch the amplitude spectrum for the periodic signal *w(t)* shown in the Figure.



$\frac{A}{n\pi}$ → odd (n)

2. **Find** the Fourier transform for the following signals:

(a) $x(t) = 2rect\left(\frac{t-5}{10}\right) + 8\sin(8\pi t)$

(b) $g(t) = \frac{1}{2}\delta(t+\frac{1}{4}) + \frac{1}{2}\delta(t-\frac{1}{4})$.

(c) $w(t) = te^{-at}u(t)$

3. Show that if $g(t) \leftrightarrow G(f)$ then

$$\frac{d^n g(t)}{dt^n} \leftrightarrow (j2\pi f)^n G(f)$$

4. A message signal m(*t*) = sin(2000π *t*) + 2cos (4000π *t*)modulates a carrier $c(t)=100\cos(2\pi f_c t)$ where $f_c=1MHz$ to produce an AM signal *s(t)* with transmitted carrier :

a. Find and sketch the spectrum of the AM wave. ✓

b. Determine the ratio of the power in the sidebands to the total power.

c. Find the modulation index.

d. Explain one method to generate s(t) and one method to recover the original message *m(t)* from *s(t)*.

$\sin(a+b) = \sin a \cos b + \cos a \sin b$

$\sin(a-b) = \sin a \cos b - \cos a \sin b$

$\sin a \cos b = \frac{1}{2}[\sin(a+b) + \sin(a-b)]$

امتحان اعمال السنة 2 مادة:مجتمع تكنولوجيا المعلومات الفرقة: 2 حاسبات ابريل 2015 الزمن: ساعة

اجب عن الأسئلة التالية:

1- ما هي انواع برامج الحاسب؟ و ماالمقصود بقاعدة البيانات؟
2- ماهي مراحل عملية اتخاذ القرار؟
3- ماهي مكونات نظام الأرشيف الألكتروني؟
4- اذا كنت مفوضا في مكان عملك، اذكر كيف يمكنك اثبات ذلك؟
5- ما هي الخطوات التي يمكن اتخاذها في وضع سياسة امن البيانات؟